

Claims

1 **[Amended]** A fixation apparatus for limiting the rotation of the ocular globe of an eye, to facilitate alignment of an instrument with the axis of astigmatism of the eye, including:

5 fixation target means for locating in the field of view of said eye so that said eye may fixate on said target;

 wherein said fixation target means includes or consists of at least one elongate component having a fixed orientation.

2 Apparatus according to claim 1 wherein said fixation target
10 means includes or consists of at least two intersecting, substantially mutually perpendicular elongate components.

3 Apparatus according to claim 2 wherein said fixation target means consists substantially of a cross.

4 Apparatus according to claim 2 or 3 wherein one of the at least
15 two elongate components is longer than the other.

5 Apparatus according to claim 1 wherein said fixation target means includes more than two elongate components arranged as a grid.

6 Apparatus according to any one of claims 1 to 5 wherein said fixation target means is a light emitting means.

7 Apparatus according to claim 6 wherein the or each said
20 elongate component is defined by said light emitting means.

8 Apparatus according to claim 6 or 7, wherein said light emitting means includes a plurality of light emitting diodes arranged in a respective linear array to define the or each said elongate component.

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9 Apparatus according to claim 8, further including a printed circuit board (PCB) on which the light emitting diodes are mounted.

10 Apparatus according to any one of claims 6 to 9, further including means to strobe said light emitting means.

5 11 Laser surgery apparatus incorporating patient observable fixation apparatus according to any one of claims 1 to 10.

12 Laser surgery apparatus according to claim 11, wherein said fixation target means is disposed in a patient observable position on a surgical microscope of said laser surgery apparatus.

10 13 Laser surgery apparatus according to claim 12 wherein said at least one elongate component is arranged in a "vertical" orientation on said surgical microscope.

15 14 **[Amended]** A method for limiting the rotation of the ocular globe of an eye to facilitate alignment of an instrument with the axis of astigmatism of the eye, including providing fixation target means in a field of view of said eye so that said eye may fixate on said target, wherein said fixation target means includes or consists of one elongate component having a fixed orientation.

20 15 A method according to claim 14, wherein said fixation target means includes or consists of at least two intersecting, substantially mutually perpendicular elongate components.

16 A method according to claim 15, wherein said fixation target means consists substantially of a cross.

17 A method according to claim 14, wherein said fixation target means includes more than two components arranged as a grid.

25 18 A method according to anyone of claims 14 to 17, including providing said fixation target means by way of light emitting means.

19 A method according to claim 18, wherein said light emitting means includes a plurality of light emitting diodes arranged in a respective linear array to define the or each said elongate component.

20 A method according to claim 18 or 19, further including strobing
5 of said light emitting means.

21 Apparatus for supplying visual feedback to an operator during refractive surgery of an eye, including:

fixation target means for said eye to fixate upon;

viewing means for viewing said eye while it is fixated upon said
10 fixation target means;

controller means for generating an information display; and

screen means for displaying said information display for viewing
by said viewing means;

whereby said eye and said information display may be viewed
15 simultaneously by said operator.

22 Apparatus according to claim 21, further including display means for displaying said information display.

23 Apparatus according to claim 21 or 22, wherein said fixation target means includes or consists of at least one elongate component.

20 24 Laser surgery apparatus, including a surgical laser and apparatus for supplying visual feedback during laser surgery performed on an eye with the laser, which latter apparatus is according to claim 21, 22 or 23.

25 Apparatus according to any one of claims 21 to 24, wherein said screen means is a miniature TV or LCD screen or a plurality of LEDs.

26 Apparatus according to any one of claims 21 to 25, wherein said viewing means is a surgical microscope.

27 Apparatus according to any one of claims 21 to 26, wherein said controller means is a computer.

5 28 Apparatus according to any one of claims 21 to 27, wherein said information includes an alert signal indicating misalignment of the patient's eye eg. due to straying from fixation upon said fixation target means.

29 Apparatus according to any one of claims 21 to 28, wherein said information pertains to one or more of: the of status of the patient, the surgery, the
10 equipment, the position of the eye, or where an eye-tracker is aiming the laser.

30 Apparatus according to any one of claims 21 to 29 wherein said information includes one or more of the following elements of operational information: type of treatment, number of laser pulses required to finish, operation time remaining, patient identification and which eye is being treated, keratometry
15 information, refraction information, and/or topographical information.

31 A method for supplying visual feedback to an operator during refractive surgery of an eye of a patient, including:

1) providing fixation target means for said eye to fixate upon;
2) locating said eye for viewing by said operator by means of
20 viewing means while the eye is fixated upon said fixation target means;

3) generating an information display of information pertinent to said surgery and suitable for displaying visually; and

4) transmitting said information display to said viewing means for viewing by said operator;

25 whereby said eye and said information display may be viewed

simultaneously by said operator.

32 A method according to claim 31, including updating said information display.

33 A method according to claim 31 or 32, further including
5 generating said information display with a controller means.

34 A method according to claim 33, further including transmitting said information display to a display means and displaying said information display on said display means.

35 The method of any one of claims 31 to 34, wherein said fixation
10 target means provided includes or consists of at least one elongate component.

36 A method of performing refractive surgery on an eye of a patient wherein visual feedback is supplied in accordance with any one of claims 31 to 35.

37 A method according to any one of claims 31 to 36, wherein said information includes an alert signal indicating misalignment of the patient's eye eg.
15 due to straying from fixation upon said fixation target means.

38 A method according to any one of claims 31 to 37, wherein said information pertains to one or more of: the status of the patient, the surgery, the equipment, the position of the eye, or where an eye-tracker is aiming the laser.

39 A method according to any one of claims 31 to 38 wherein said
20 information includes one or more of the following elements of operational information: type of treatment, number of laser pulses required to finish, operation time remaining, patient identification and which eye is being treated, keratometry information, refraction information, and/or topographical information.

40 An apparatus according to any one of claims 1 to 13 or 21 to 30, wherein said fixation target means has a fixed orientation.

41 A method according to any one of claims 14 to 20 or 31 to 39 wherein said fixation target means is provided so as to have a fixed orientation.